

Practice Problems for Differentiation

Differentiate the following functions (with respect to x), showing *all* steps.

$$f(x) = x^3 - 3x^2$$

$$f(x) = \frac{2x^3-1}{x^2}$$

$$f(x) = x^{1/3} - x^{-2/3}$$

$$f(x) = \frac{x+1}{x^2+1}$$

$$f(x) = \frac{6x-5}{\sin x}$$

$$f(x) = \frac{\cos x - \sin^2 x}{\tan(x^2)}$$

$$f(x) = (3x^2 + 7x)(x^3 - 3x + 5)$$

$$f(x) = \left(x^2 + \frac{1}{x}\right)^5$$

$$f(x) = (x^3 - 1)^4(x^2 + 5)^{1/3}$$

$$f(x) = \sqrt{x}\sqrt{x^2 + 1}$$

$$f(x) = \sqrt[3]{x^3 - 1}$$

$$f(x) = \sqrt[4]{\sec x}$$

$$f(x) = \csc^2 x + \cot(x^3)$$

$$f(x) = \csc^3 x \cot(x)$$

$$f(x) = x \sec x + x^2 \tan x$$